

**What is claimed is:**

1                   1. A plasma enhanced CVD apparatus, comprising:  
2                   a process chamber including an upper chamber with a dome shape,  
3                   a lower chamber, and an insulator placed between the upper chamber and  
4                   the lower chamber;  
5                   a gas distributing ring installed in the process chamber for ejecting a  
6                   gas in an upward direction inside the process chamber;  
7                   a susceptor installed below the gas distributing ring for supporting a  
8                   wafer thereon, and having a heater for controlling a temperature of the wafer  
9                   and an internal temperature of the process chamber;  
10                  a plasma compensation ring installed at an upper part of sidewalls of  
11                  the susceptor;  
12                  a vacuum pump connected to the process chamber; and  
13                  an electric power source connected to the upper chamber and the  
14                  lower chamber.

1                   2. The apparatus as claimed in claim 1, wherein the gas distributing  
2                   ring has a plurality of nozzles at inner walls thereof, wherein each of the  
3                   plurality of nozzles is upwardly sloped with an inclination of a predetermined  
4                   degree.

1                   3. The apparatus as claimed in claim 2, wherein the degree of  
2                   inclination is in a range of from 30°C to 60°C.

1           4. The apparatus as claimed in claim 1, wherein the gas distributing  
2 ring is made of stainless steel.

1           5. The apparatus as claimed in claim 1, further comprising a loadlock  
2 chamber connected to the process chamber.

1           6. The apparatus as claimed in claim 1, wherein the susceptor is  
2 coated with  $\text{Al}_2\text{O}_3$ .

1           7. The apparatus as claimed in claim 1, wherein the plasma  
2 compensation ring is formed of stainless steel.

1           8. A method of forming a nitride layer using a plasma enhanced  
2 CVD comprising:

3           loading a wafer onto a susceptor;

4           supplying a first reactive gas containing nitrogen  $\text{N}_2$  to a process  
5 chamber;

6           leaving the wafer intact for a first delay time;

7           forming a basic layer on the wafer by converting the first reactive gas  
8 into plasma which is created by applying electric power to the process  
9 chamber;

10          leaving the wafer intact for a second delay time;

11                   forming a nitride layer on the wafer having the basic layer thereon by  
12                   supplying a second reactive gas to the process chamber and converting the  
13                   second reactive gas into plasma;  
14                   leaving the wafer intact for a third delay time;  
15                   stopping the supply of the first and second reactive gases to the  
16                   process chamber;  
17                   leaving the wafer intact for a fourth dealy time;  
18                   stopping applying the electric power; and  
19                   unloading the wafer from the susceptor.

1                   9. The method as claimed in claim 8, wherein loading and unloading  
2                   the wafer are performed through a loadlock chamber connected to the  
3                   process chamber.

1                   10. The method as claimed in claim 8, wherein ammonia is used as  
2                   the first reactive gas and silane is used as the second reactive gas.

1                   11. The method as claimed in claim 8, wherein forming the nitride  
2                   layer is performed in the process chamber having an internal temperature of  
3                   580-670°C, an internal pressure of 0.5-0.7 mTorr and an electric power  
4                   applied thereto of 100-700 W.

1                   12. The method as claimed in claim 8, further comprising forming a  
2                   protective film on inner walls of the process chamber before loading the

3 wafer, the protective film being formed of at least two layers each of which  
4 has a dielectric constant different from the others.

1 13. The method as claimed in claim 12, wherein forming the  
2 protective film includes forming an oxide layer on the inner walls of the  
3 process chamber and forming a nitride layer on the oxide layer.

1 14. The method as claimed in claim 13, wherein forming the oxide  
2 layer is performed by supplying nitrogen oxygen gas to the process chamber  
3 and converting the same in plasma.

1 15. The method as claimed in claim 13, wherein forming the nitride  
2 layer is performed by introducing ammonia gas and silane gas into the  
3 process chamber and converting the same gases into plasma.

1 16. The method as claimed in claim 8, further comprising vacuuming  
2 the process chamber to compulsorily exhaust a gas remaining in the process  
3 chamber and supplying a cleaning gas to the process chamber after  
4 unloading the wafer.

1 17. The method as claimed in claim 8, further comprising plasma  
2 etching cleaning to clean inner walls of the process chamber and  
3 components installed in the process chamber after unloading the wafer.

- 1                   18. The method as claimed in claim 17, wherein the plasma etching
- 2                   cleaning is performed by supplying nitrogen trifluoride gas to the process
- 3                   chamber and converting the same gas into plasma.